

From: Hitzman, Murray
To: [Benjamin Simon](#); [Judy Nowakowski](#); [Applegate, David](#)
Subject: Energy and Mineral Resources
Date: Tuesday, May 16, 2017 6:06:05 PM
Attachments: [monuments doc.docx](#)
[Monuments - USGS energy and minerals annotations 5-16-17.xlsx](#)
[USGS NationalMonument RapidAnalysis May2017 \(1\).pdf](#)

Ben

please see the attached memo, table, and map. I hope this will help you with your analysis.
best

murray

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TO: Benjamin Simon, Office of Policy Analysis, DOI
FROM: Murray Hitzman, Associate Director – Energy & Minerals, USGS
SUBJECT: Office of the Secretary Executive Order 13792
DATE: May 16, 2017

EO 13792 (April 26, 2017) directed the Department of the Interior (DOI) to provide initial analysis of specified National Monuments within 45 days (June 2017) with final analysis and recommendations due within 120 days (August 2017). Attached we provide rapid input to your May 11 request for information on energy and mineral resources within the named National Monuments; our input is restricted to the onshore monuments. The data are tabulated on the attached table.

For energy resources we considered oil and gas (conventional and unconventional), coal, gas hydrates, geothermal, and uranium. We cite the most recently available energy assessments conducted by the USGS. In several cases we also cite Bureau of Land Management (BLM) Records of Decision (Carizzo Plain and Upper Missouri River Breaks). Monuments within areas of USGS energy assessments or those with known energy production are marked as red on the table. Monuments that are located adjacent to areas that include USGS energy assessments are marked in yellow. **It is very important to note that it is not scientifically valid to statistically assign energy resource numbers in an assessment unit to a specific area within a monument or portion thereof.**

Mineral resources include a wide variety of mineral commodities which are not specified on the table but are identified in the references cited. The status of historical mining within a National Monument was addressed from review of the USGS Mineral Resource Data System (MRDS) data, USGS reports, and relevant State Geological Survey mineral resource reports. Several of the monuments contain BLM Wilderness Study Areas and USFS Roadless Areas, some of which were assessed for mineral potential by the USGS in the past. The monuments that contain areas that were assessed by the USGS are noted as “Part of area assessed” and those Monuments covered by a USGS mineral assessment report are indicated as “Area assessed”. Relevant USGS mineral resource assessment, BLM Wilderness Study Area, and U.S. Forest Service (USFS) Roadless Area reports covering all or portions of the Monuments are listed in the table. Monuments with reports indicating they contain mineral potential are marked in red. **It is very important to note that it is not scientifically valid to assign specific mineral resource numbers from these reports to a monument or specific areas within a monument.**

NATIONAL MONUMENTS BEING INITIALLY REVIEWED PURSUANT TO EXECUTIVE ORDER 13792 (May 16, 2017)

| | Monument | Location | Year(s) | Acreage | Oil and Gas | Coal | Gas Hydrates | Uranium | Geothermal | Historic Mining Activity | USGS Mineral Assessment | Energy Comments | Mineral Comments |
|----|------------------------------|------------|-----------|-----------|---------------|---------------|---------------|---------------|---------------|--------------------------|---------------------------|--|---|
| 1 | Basin and Range | Nevada | 2015 | 703,585 | No Assessment | No Assessment | No Assessment | No Assessment | | Yes | Part of the area assessed | Within area of medium geothermal favorability https://pubs.usgs.gov/fs/2008/3082/ | https://pubs.er.usgs.gov/publication/b1728A |
| 2 | Bears Ears | Utah | 2016 | 1,353,000 | | No Assessment | No Assessment | | No Assessment | Yes | No assessment | Within 2 conv. AUs and 1 cont. AU, Paradox Basin Province (315 MMBO, 999 BCF, 18 MMBNGL) https://pubs.usgs.gov/fs/2012/3031/ . Area of historic uranium mining. | https://pubs.usgs.gov/circ/1952/0217/report.pdf |
| 3 | Berryessa Snow Mountain | California | 2015 | 330,780 | No Assessment | No Assessment | No Assessment | No Assessment | | Yes | Part of the area assessed | Within area of medium-to-high geothermal favorability https://pubs.usgs.gov/fs/2008/3082/ | Partially covered by Wilderness Study Area assessment Black Butte and Elk Creek Roadless Areas (https://pubs.er.usgs.gov/publication/pp13001) |
| 4 | Canyons of the Ancients | Colorado | 2000 | 175,160 | | No assessment | No assessment | No assessment | No assessment | Yes | No assessment | Within 3 conv. AUs and 1 cont. AU, Paradox Basin Province (335 MMBO, 1035 BCF, 34 MMBNGL) https://pubs.usgs.gov/fs/2012/3031/ | https://pubs.usgs.gov/pp/0481/report.pdf |
| 5 | Carrizo Plain | California | 2001 | 204,107 | No assessment | No assessment | No assessment | No assessment | No assessment | No | Part of the area assessed | Adjacent to Monterey Formation, San Joaquin Basin Province (21 MMBO, 27 BCF) https://pubs.er.usgs.gov/publication/fs20153058 ; two producing oil and gas fields in the monument, Carrizo Plain National Monument Approved Resource Management Plan and Record of Decision, April 2010, Bureau of Land Management. | https://pubs.er.usgs.gov/publication/mr88 ; Caliente Mountain Wilderness study area (https://pubs.usgs.gov/of/1990/0096/report.pdf) |
| 6 | Cascade Siskiyou | Oregon | 2000/2017 | 100,000 | No assessment | No assessment | No assessment | No assessment | | No | Area assessed | Adjacent to area of high geothermal favorability to immediate east https://pubs.usgs.gov/fs/2008/3082/ | https://pubs.usgs.gov/publication/b1744C https://pubs.usgs.gov/circ/1986/0976/report.pdf . 1by2 degree sheet min assessment |
| 7 | Craters of the Moon | Idaho | 1924/2000 | 737,525 | No assessment | No assessment | No assessment | No assessment | No assessment | No | Area assessed | Energy - No relevant assessments; | https://pubs.usgs.gov/mf/1462-B/ ; https://pubs.er.usgs.gov/publication/sir20165089 |
| 8 | Giant Sequoia | California | 2000 | 327,760 | No assessment | No assessment | No assessment | No assessment | No assessment | No | Part of the area assessed | Energy - No relevant assessments; | Mineral resource assessment map of California (https://pubs.usgs.gov/publication/mr88); Partially covered by Wilderness Study Area assessment Kings River, Rancheria, Agnew, and Oat Mountain Roadless Areas (https://pubs.er.usgs.gov/publication/pp13001); https://pubs.er.usgs.gov/publication/mr88 ; |
| 9 | Gold Butte | Nevada | 2016 | 296,937 | No assessment | No assessment | No assessment | No assessment | No assessment | Yes | Part of the area assessed | Energy - No relevant assessments; | https://pubs.usgs.gov/sir/2006/5197/sir2006-5197c.pdf |
| 10 | Grand Canyon-Parashant | Arizona | 2000 | 1,014,000 | No assessment | No assessment | No assessment | | | Yes | Area assessed | Within Northwestern Arizona Uranium Area, Colorado Plateau Province (3950 MM pounds) https://pubs.usgs.gov/sir/2012/5239/ . Adjacent to area with med-high geothermal favorability. | https://pubs.er.usgs.gov/publication/70177936 https://pubs.usgs.gov/bul/0580d/report.pdf and https://pubs.usgs.gov/bul/1748a/report.pdf |
| 11 | Grand Staircase-Escalante | Utah | 1996 | 1,700,000 | | | No assessment | | No assessment | Yes | Part of the area assessed | Within Kaiparowitz Plateau Coalbed Gas AU/Coal AU Paradox Basin (450 BCF; 16 MMST coal) https://pubs.usgs.gov/fs/2012/3031/ . Possible uranium resource. | Wahweap, Paria-Hackberry, Cockscomb Wilderness Study Areas (https://pubs.usgs.gov/bul/1748a/report.pdf) and Steep Creek (https://pubs.usgs.gov/bul/1747b/report.pdf) Wilderness Study Areas. |
| 12 | Hanford Reach | Washington | 2000 | 194,451 | No assessment | No assessment | No assessment | No assessment | No assessment | No | No assessment | Energy - No relevant assessments; | No relevant assessments |
| 13 | Ironwood Forest | Arizona | 2000 | 128,917 | No assessment | No assessment | No assessment | No assessment | No assessment | Yes | Part of the area assessed | Energy - No relevant assessments; | https://pubs.usgs.gov/bul/1702h/report.pdf |
| 14 | Mojave Trails | California | 2016 | 1,600,000 | No assessment | No assessment | No assessment | No assessment | No assessment | Yes | Part of the area assessed | Energy - No relevant assessments; | https://pubs.er.usgs.gov/publication/mr888 ; Chemehuevi Mountains https://pubs.er.usgs.gov/publication/ofr87586 , https://pubs.er.usgs.gov/publication/mf1584A . Sheep Hole Mountains https://pubs.er.usgs.gov/publication/ofr82957 . Turtle Mountains https://pubs.er.usgs.gov/publication/17138 . Morongo https://pubs.er.usgs.gov/publication/b17138 . East Mojave National Scenic Area https://pubs.er.usgs.gov/publication/b2160 |
| 15 | Organ Mountains-Desert Peaks | New Mexico | 2014 | 496,330 | No assessment | No assessment | No assessment | No assessment | | Yes | Part of the area assessed | Within area interspersed with medium-to-high geothermal favorability https://pubs.usgs.gov/fs/2008/3082/ | Monument includes Organ Mountains WSA (https://pubs.usgs.gov/bul/1735d/report.pdf), Aden Lava Flow WSA (https://pubs.usgs.gov/bul/1735b/report.pdf), and Luna County assessment (https://geoinfo.nmt.edu/publications/openfile/downloads/400-499/459/LUNA.pdf) |
| 16 | Rio Grande del Norte | New Mexico | 2013 | 242,555 | | | No assessment | No assessment | | Yes | No assessment | Adjacent to Raton Basin Coalbed Province (2350 BCF and 28 MMBNGL) https://pubs.usgs.gov/dds/069/dds-069-n/REPORTS/69_N_CH_2.pdf . Med-high geothermal. | https://geoinfo.nmt.edu/staff/mclemore/documents/McLemore_Mullen.pdf |
| 17 | Sand to Snow | California | 2016 | 154,000 | No assessment | No assessment | No assessment | No assessment | | Yes | Part of the area assessed | Adjacent to Monterey Formation, Los Angeles Basin Province (13 MMBO, 22 BCF) https://pubs.er.usgs.gov/publication/fs20163036 | Partially covered by Wilderness Study Area assessment Sheep Mountain Wilderness Study Area and Cucamonga Wilderness and Additions (https://pubs.er.usgs.gov/publication/pp13001) |
| 18 | San Gabriel Mountains | California | 2014 | 346,177 | | No assessment | No assessment | No assessment | No assessment | Yes | Part of the area assessed | Situated north of high geothermal favorability; https://pubs.usgs.gov/fs/2008/3082/ | Partially covered by Wilderness Study Area assessment Sheep Mountain Wilderness Study Area and Cucamonga Wilderness and Additions (https://pubs.er.usgs.gov/publication/pp13001); https://pubs.er.usgs.gov/publication/mr88 ; |
| 19 | Sonoran Desert | Arizona | 2001 | 486,149 | No assessment | No assessment | No assessment | No assessment | | Yes | Part of the area assessed | Adjacent to Monterey Formation, Los Angeles Basin Province (13 MMBO, 22 BCF) https://pubs.er.usgs.gov/publication/fs20163036 | Partially covered by Wilderness Study Area assessment Sheep Mountain Wilderness Study Area and Cucamonga Wilderness and Additions (https://pubs.er.usgs.gov/publication/pp13001) |
| 20 | Upper Missouri River Breaks | Montana | 2001 | 377,346 | | No assessment | No assessment | No assessment | No assessment | Yes | Part of the area assessed | Within North Central Montana Province (biogenic gas; 6 BCF) https://pubs.usgs.gov/fs/2008/3036/pdf/FS08-3036_508.pdf ; Upper Missouri River Breaks National Monument, Record of Decision and Approved Resource Management Plan, December 2008, Bureau of Land Management. | https://pubs.usgs.gov/bul/1722c/report.pdf ; https://pubs.er.usgs.gov/publication/ofr791204 ; https://pubs.usgs.gov/bul/1722a/report.pdf |
| 21 | Vermilion Cliffs | Arizona | 2000 | 279,568 | No assessment | No assessment | No assessment | No assessment | No assessment | Yes | Area assessed | Energy - No relevant assessments; | Wilderness Study Area mineral assessment https://pubs.er.usgs.gov/publication/mf1475D |
| 22 | Katahdin Woods and Waters | Maine | 2016 | 87,563 | No assessment | No assessment | No assessment | No assessment | No assessment | No | No assessment | Energy - No relevant assessments; | No Mineral Resource Data Record files nor USGS mineral resource assessment reports in Monument area |



Monument area within USGS Energy Assessment Unit (AU), has historic U mining activity, has geothermal potential, or has historic mining activity and has assessed mineral potential

Monument area adjacent to USGS Energy Assessment Unit (AU), has possible U resources, or is near area of geothermal potential

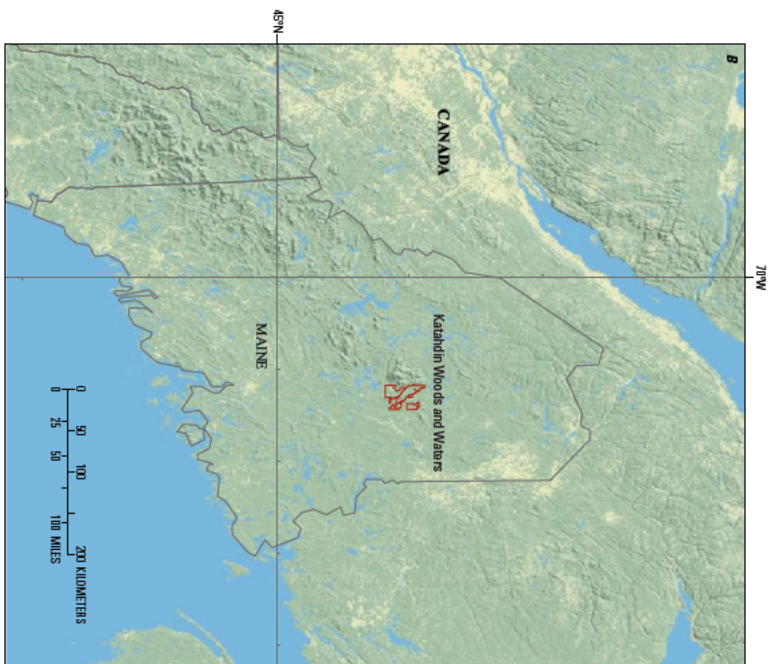
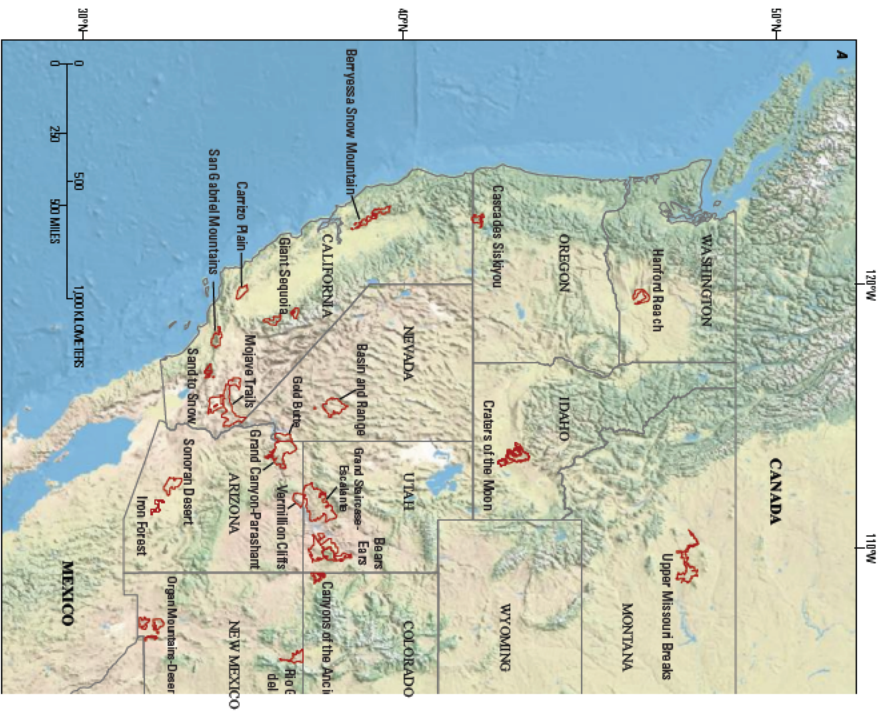
Additional resources:

Map of unconventional resources of the U.S. <https://pubs.usgs.gov/dds/069/dds-069-ii/>

Map of coalbed gas resources of the U.S. <https://pubs.usgs.gov/dds/069/dds-069-ii/>

Critical Analysis of World Uranium Resources <https://pubs.usgs.gov/sir/2012/5239/>

Assessment of Moderate- and High-Temperature Geothermal Resources of the United States <https://pubs.usgs.gov/fs/2008/3082/>



National Monuments in both the western United States (**A**) and the eastern United States—Maine (**B**) that were the subject of rapid analysis of existing data undertaken by the USGS, May 2017